



AN
A C C O U N T
OF THE EFFICACY OF THE
AQUA MEPHITICA ALKALINA;
OR,
SOLUTION OF FIXED ALKALINE SALT,
SATURATED WITH FIXIBLE AIR,
IN
CALCULOUS DISORDERS,
AND OTHER
COMPLAINTS OF THE URINARY PASSAGES.

BY
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THE SECOND EDITION.

With large Additions and several new Cases.

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T O
BENJAMIN COLBORNE, Esq.
O F T H E
C I T Y O F B A T H.

D E A R S I R,

ALLOW me to express in this place my unfeigned sense of your Humanity and Benevolence, not only in communicating to the World a most valuable discovery in Medicine, but also in your unwearied attention to procure every information concerning it, in order to render it as useful as possible.

I esteem myself particularly happy in being permitted to share, in however small a degree, in so good a
A 2 Work.

iv DEDICATION.

Work. May its nature and advantages become more publickly known and attended to, and may you yourself meet with, what to you will be the best and indeed only recompense, the satisfaction of seeing the remedy, to which, under Providence, your present happy state of health is owing, extended to the relief of numerous objects labouring under the same painful malady, under which you suffered so greatly. That you may long enjoy every happiness of Life is the hearty wish of,

Dear Sir,

Your much obliged,

And sincere Friend,

And Humble Servant,

Bath, May,
1787.

W. FALCONER.

*On the Use of the Aqua Mephitica Alkalina,
or Solution of Fixed Alkaline Salt, satu-
rated with Fixible Air in Calculous Com-
plaints.*

THE merit of the original discovery that alkaline salts were capable of being completely neutralized by Fixible Air, is, I apprehend, due to Mr. BEWLY, of Great Massingham, in Norfolk; who in some experiments, related in the Appendix to Dr. Priestley's second volume of Experiments and Observations on different kinds of Air, has fully proved this point. That gentleman has recommended the use of water thus impregnated in putrid cases, and others wherein the introduction of Fixible Air in large quantities might be advisable, but does not appear to have had any medical experience of its efficacy. Since that time it has been frequently used by practitioners in place of the common

saline draught, and I believe with little difference in effect.

The honour, however, of the discovery, of what I apprehend to be its most important quality hitherto known, that of relieving calculous complaints, is due to a gentleman of this city, Benjamin Colborne, Esq. who had formerly been of the medical profession, which he practised many years with great reputation to himself and service to mankind.

Having been a severe sufferer from calculous complaints, he was induced to make trial of several of the most celebrated remedies, but was, after long and sad experience, convinced but too well of the inefficacy or danger of most, if not all of the so boasted lithontriptics. He was then led, fortunately for himself, to make trial of the remedy now under consideration, and the event answered much beyond his hopes, and has added greatly to his happiness; not only by the relief he has himself experienced from it, but also by the opportunities it has afforded him of indulging,

dulging, in the most disinterested manner, his benevolent disposition, by recommending its use to several of his friends who laboured under the same malady.

Mr. Colborne was led to this discovery, partly from observing the dissolvent powers of alkaline salts upon the urinary calculus out of the body, and still more by remarking the changes produced by their internal use on the urine of those afflicted with these disorders, rendering that clear and of a natural colour, which was before turbid and disposed to precipitation. The disagreeable taste, however, of the uncombined alkali, which is moreover so nauseating to the stomach, together with its caustic, septic, and irritating effects on the animal system, the urinary passages particularly, were great discouragements to its use. Could these be obviated by any combination that would still leave the alkaline salt at liberty to unite with the acid that is supposed to contribute to the formation of these calculi, the purpose of preventing their being generated, or possibly of dissolv-

ing them when formed, would probably be in a good measure answered.

Fixible Air seemed to him adapted to this purpose in every respect, as it forms with the alkali a neutral salt, perfectly mild in its nature, agreeable to the taste and stomach, and powerfully antiseptic. At the same time their combination is so loose, that the alkali is easily separated from the air by any other acid it may meet with.

He moreover found by experience, that this combination possessed no inconsiderable dissolvent powers upon the human calculus out of the body. Hence he was induced to make trial of it himself, and to recommend it to others. The accounts of its success here subjoined will, I trust, prove that his expectations were not ill founded.

The most convenient method of preparing the alkaline solution is as follows. Put two ounces and a half troy weight, or if troy weights are not at hand, two ounces
and

AQUA MEPHITICA ALKALINA. ,

and three quarters *avoirdupois, of dry salt of tartar into an open earthen vessel, and pour thereon five full quarts, wine measure, of the softest water, that is clean and limpid, that can be procured, and stir them well together with a clean piece of wood. After standing 24 hours, carefully decant, from any indissoluble residuum that may remain, as much as will fill the middle part of one of the glass machines for impregnating water with Fixible Air.† The alkaline liquor is then to be exposed to a stream of Air according to the directions commonly given for impregnating water § with that fluid. When the alkaline solution has remained in this situation till the

Fixible

* Two ounces and a half troy weight contain 1200 grains; two ounces and three quarters avoirdupois contain 1201 grains and a quarter of a grain.

† If the salt of tartar be good, and perfectly soluble in the water, every ounce measure of the alkaline solution should contain seven grains and a half of alkaline salt.

§ Those machines that have a contrivance for drawing off the water without separating the parts of the vessel are most convenient. The directions given with the machines sold by Mr. Parker in Fleet-street, will serve this purpose very well, save that the alkaline solution requires more of the effervescing materials, and a longer time to saturate it than simple water.

Fixible Air ceases to rise, a fresh quantity of the fermenting materials should be put into the lower part of the machine, and the solution exposed to a second stream of Air, and this process repeated four times. When the alkaline liquor shall have continued about 48 hours in this situation, it will be fit for use, and should then be carefully drawn off into perfectly clean bottles (pints are I think preferable) and closely corked up. The bottles should then be placed with their bottoms upwards* in a cool place, and with these precautions it will keep several weeks, and perhaps much longer, very good. The quantity of alkaline solution above directed to be mixed at the beginning of the foregoing directions, is judged to be sufficient to fill the glass machines of the common size twice over, without pouring off the liquor so deep as to hazard making the solution turbid, by stirring up the indissoluble residuum which is precipitated at the bottom

* A shelf with holes in it to put the necks of the bottles into, such as are commonly used for wine decanters, is convenient for this purpose.

tom* of the vessel. The water in which the alkali is dissolved, should be as free of foreign impregnations as possible, as the alkali, by decomposing them, will not only cloud the water, but form other combinations inconsistent, perhaps, with the effects to be wished for from the remedy. The intention therefore of mixing the salt of tartar with the water the day before, and of the caution recommended in pouring it off, is to allow time for any precipitation occasioned by the mixture to settle, as well as to separate the indissoluble parts of the salt of tartar itself. Nor is less attention necessary in procuring the salt of tartar pure and in perfection; and on that account it should be got from such places only as can be depended upon. When properly prepared, the alkaline mephitic water should be perfectly clear and rather sparkling, of an acidulous taste, and totally free of that disagreeable impression which alkaline salts make on the tongue and throat.

About

* If the alkaline solution as above directed should be found too irritating, it may be made with a smaller proportion of the salt. See Mr. Melmoth's Case.

About eight ounces by measure appear, from some of the cases, to have been taken thrice in 24 hours for a considerable time together, and to have agreed well with the stomach, appetite, and general health; but I apprehend most people will think this too large a quantity, and I believe, that for most cases, two thirds, or a pint of the alkaline liquor in 24 hours may suffice; should the bulk of the separate doses* be thought too large, the alkaline solution may be made of double the strength, in which case, half the quantity will be enough. The times of taking three doses in the day have been, I believe, pretty early in the morning, about noon, and about six in the evening. If twice a day, about noon and in the evening; and if once, which in many cases seems sufficient for a preventative, about an hour and a half before dinner. Common prudence dictates that such a remedy should be taken at such times as the stomach is least likely to be loaded with victuals.

I do not find, from observation or inquiry,

* See Dr. Cooper's Case.

quiry, that a rigid adherence to any particular regimen of diet is necessary, farther than the usual prudential cautions of moderation and temperance.

The Reverend Dr. Cooper has made use of fruit, wine, and other things subject to acescency, during the time of his taking the solution; yet no person, as will appear by his very judicious account, has received greater benefit. I, however, think it would be advisable to abstain from acids, and from such things as are subject to become acescent, for some time before, and also after the time of taking the doses of the alkaline solution. I do not find either from my own observation, or from the accounts of others, that any very perceivable effects, save that most to be wished, the abatement of the troublesome symptoms, followed the taking this remedy. I have inquired of a very sensible person of this city, who has taken the solution in the largest quantity of any that I have known; and he assures me, that he found no effect from it, save that of gently opening the body.

Mr. Bewly speaks of a dose of it that he took affecting the head (with vertigo I suppose) and proving a pretty strong diuretic. But no such consequences have been generally observed by those persons of whom I have had an opportunity of inquiring. The person before referred to, informed me, that though it kept the body gently open, it had no effect in increasing the quantity of urine; Mr. Bewly's dose was indeed large, he having taken at one dose, such a quantity of the alkaline solution as contained 24 ounces by measure of Fixible Air, whereas the quantity of air taken at a time in a dose of the solution above directed, is not calculated to exceed 15 ounces, but this was repeated three times a day, and no such effect observed. With respect to the diuretic quality, it is well known that the expectation of such an effect from any thing we take, will often prove a very powerful means of producing it.

Should it prove cold or flatulent to the stomach, as I have myself known it to do, though I believe that rarely happens, a
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small portion of spirits, as rum or brandy, * or any of the other spirituous waters or tinctures, may be used without any diminution of its good effects. A tea spoonful of rum is mentioned to be taken with each dose of the solution, in one of the cases subjoined, and I have myself directed a small quantity of tincture of cardamoms and of compound spirit of lavender, with evident advantage. Mr. Colborne has found hot milk in the proportion of about one fourth to that of the alkaline solution, to be a very grateful addition, especially in cold weather, and what tended much to reconcile it to the stomach, and this without impairing in the least its good qualities.

C A S E I.

Benjamin Colborne, Esq. of this city, was, in the year 1760, attacked with a violent nephritic paroxysm, which, after continuing seven or eight days, and being treated with anodyne, oily, and mucilaginous

* See Dr. Cooper's Case;

ginous medicines and bleeding, terminated in the discharge by urine, of a red stone larger than a vetch or tare, after which he continued tolerably well for eight or ten months; often, however, observing small calculous concretions to come away, attended with irritation of the urinary passages. In about ten months after the first attack, he had another, but neither so violent or of so long duration, which terminated like the first, in the discharge of a stone of a similar colour to the foregoing, but of a smaller size. The nephritic paroxysm again returned in about five or six months, but not so violent as at first. During this time he was in a course of taking mucilaginous and lubricating remedies.

After this he made trial of Mrs. Stephen's remedy, as prepared by Dr. D'Eschernay, of which he took about an ounce in a day, once or twice a week.

After this he continued free of nephritic complaints about a year and half. That medicine, however, agreed so ill with his stomach,

stomach, producing nausea, indigestion, and crudities, that he was obliged to leave it off. About three or four months afterwards he had another attack, which returned again upon him every ten or twelve weeks. At this time he was in a course of taking an infusion of the wild carrot seed, and drank distilled water as his usual drink.

In the year 1766, he made a trial of Blackrie's lixivium (or Chittick's remedy), and though it agreed with him rather better than the soap, yet it was so caustic and irritating to the mouth and throat, and produced such painful sensations in his stomach, that he was obliged to leave it off; after which his nephritic paroxysm returned every eight or ten weeks as before. In the year 1774, he went to Spa for a complaint in his bowels, which he ascribed to the use of his caustic lixivium, and during the time of his drinking these waters, had no return of calculous complaints; but on his coming back to England he was attacked as formerly.

In the beginning of the year 1778, he
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made trial of water simply impregnated with Fixible Air, which proved too irritating and diuretic. On March 27th of the same year, he had an attack of the gout, which continued on him until the 14th of April, when he was taken with a violent vomiting, attended with pain in the left kidney. By the help of the warm bath and bleeding, he passed another calculus. After this he had a second attack of the gout, which continued a few days.

As soon as it was over he began the use of the alkaline medicine with Fixible Air, as above described, of which he took about six or seven ounces twice a day. During the use of this he parted with no gravel, his urine deposited no sediment whatsoever, or discoloured the vessel, though if it was omitted even for a few days, these appearances took place, and small bits of gravel were perceivable in his water.

From this time he continued in perfect health, and free of all nephritic complaints, until the 26th of August 1783, when, about three in the morning, he was taken
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with an irritation in the urinary passages, which prevented his sleep; his urine however was not high coloured; about seven in the morning he had two purging stools; he had but little pain in the kidney, but a heavy obtuse sensation over the os pubis, which continued with some sickness till about two o'clock, when the stone seemed to enter the bladder. From that time he became perfectly easy.

In order to discharge the stone from the bladder, he drank large quantities of mucilaginous liquors, and retained his urine as long as possible. About six in the evening he discharged a red calculus, smaller than what he had before done.

It is proper to observe, that he had been at Harrowgate about four or five weeks before this happened, and drank the Harrowgate water, which as it acted not only as a purgative, but as a diuretic also, he was induced to think he might safely omit the alkaline solution. It appeared however, to his great disappointment, that the calculus was generated during that interval. From

that time to the present, he has never, for two days successively, omitted taking the mephitic alk. solution, and has never since felt the smallest uneasiness; no grains of sand or other precipitation in the urine, nor any discolouration of the vessel, except when the medicine is omitted for a day. But, upon taking the solution again, the urine made afterwards dissolves the former discolouration, and still continues perfectly clear. During the time he was subject to nephritic paroxysms, his urine was subject to putrefy very soon, but since he has taken the solution it will keep three or four days in the warmest weather without shewing any signs of that disposition. His general dose as a preventative is about seven ounces daily. His health, strength, and spirits, are all perfectly good; and, as he thinks, better than they were twenty years ago.

Since the above account was written, which is now about two years ago, Mr. Colborne has had two fits of the gout; the one slight, the other more severe, which last confined him for a fortnight. Both fits, however, went off perfectly well,
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without any translation of the gout to the head, lungs, or any of the viscera. He drank the mephitic alk. water, with the addition of a little brandy, during both the fits, and it agreed with him perfectly well. His health, strength, and spirits, are as good now as they were two years ago.

C A S E II.

Mrs. Southcote, a lady of this city, was first afflicted with complaints of this kind about the year 1754, when she had an attack that lasted several days; after which, to her great surprise, she voided a calculus, not having before apprehended the nature of her disorder. She continued free from any complaint of the kind for about ten years, when, in the year 1764, she had a return, and from that time the attacks recurred every ten or twelve weeks, accompanied with the discharge of numerous calculi: one, however, she had reason to believe remained, and probably still remains too large to pass, which aggravated her pain, and produced blood on

the slightest motion. The pains in the kidneys, nevertheless, still continued, and the last paroxysm she had of this kind, which was in 1779, was so violent, that her life was despaired of for ten or twelve days. At last, however, after taking large quantities of oily and mucilaginous remedies, the free use of opium, and the warm bath, an oblong stone was discharged about the shape and size of a large orange seed. As soon as she had recovered a little strength after this severe attack, she began, in the same year, to make trial of the aqua mephitica alkalina, taking six or seven ounces twice a day, which she still persevered in. Since that time she has had no more nephritic attacks; has parted with no calculi, and her urine continues clear and free of sediment. She often feels a sensation of weight, and some uneasiness in her bladder, but never has any bloody water, bears exercise well, is able to walk for an hour or two at a time, and uses a carriage almost daily without pain or aggravation of uneasiness. Her general state of health, though valetudinary, has been much bet-

ter since the trial of this remedy than before.

Since the above case was drawn up, and sent to the printer, I have received the following account.

“ In the beginning of Sept. (1784), Mrs. S. went into Berkshire, where she continued three weeks. Soon after her arrival she was seized with a feverish complaint, which occasioned her to omit the alk. solution, which she not only discontinued during her stay in the country, but for a month after her return to Bath. During this interval, she began to feel some uneasiness in her left kidney, on which she again commenced the use of the remedy once a day. On Dec. 27th last, she was seized with pain and other symptoms attending the passage of a calculus; which, after a painful night, came away about nine the next morning. It was about the size of a pea; she soon recovered, and is now well and easy.”

It is her opinion, and appears highly
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probable, that this calculus was formed during the time of the remedy's being omitted. Mrs. Southcote has had no return of her nephritic complaint, and is able to walk and bear the motion of a carriage without the least pain or inconvenience; but feels sometimes an uneasy sensation in the bladder, and believes she has two calculi formed there. April 30, 1787.

C A S E III.

The Reverend Dr. Cooper, of Sunning, in Berkshire, a most worthy and amiable character, is likewise a remarkable instance of the efficacy of the neutralized alkaline solution.

But this gentleman's case is related by himself, in a letter to my late friend, with such accuracy and propriety, as well as animated description, suggested by the memory of feelings, too severe to be erased, that I cannot forbear giving it to the reader in his own words; subjoining also a confirmation of the benefit he had received,
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and of his present good state of health, extracted from a letter I myself had the pleasure lately to receive from him. One trivial circumstance I will take the liberty to remark, that Dr. Cooper, in one part of his letter to Dr. Dobson, seems to have thought that the *aq. mephitica alkalina*, or alkaline solution saturated with Fixible Air, was recommended in the Medical Commentary, as a remedy for calculous disorders, whereas it is only recommended there as containing a large quantity of Fixible Air, which was to be set loose by a subsequent addition of an acid, which was directed to be taken immediately after the exhibition of the alkaline solution. It does not appear that Dr. Dobson, at the time he composed the Medical Commentary on Fixed Air, was at all acquainted with the good effects of the alkaline solution thus impregnated in these complaints. Though he recommends its use, it is only with a view to its immediate decomposition by an acid. The remedy, however, from which Dr. Cooper received benefit, was, as appears from his own account, the alkaline solution saturated with Fixed Air, without

without any other addition ; though he occasionally made use of the effervescent saline draught, when a machine for impregnating the water with Fixed Air was not at hand.

The Rev. Dr. Cooper's Letter to Dr. Dobson.

“ Dear Sir,

“ It gives me great pleasure to hear you design taking up the pen again in favour of *Fixed Air*. The efficacy of that volatile principle (when combined with some alkaline salt) in putrid and other disorders, is sufficiently manifested in your very ingenious Commentary on that subject ; and nothing now is wanting completely to establish its character, than the making better known to the world its superior virtues in nephritic complaints also. Of this superiority, I am sensible, you have several proofs before you, even in this place, and some of them much stronger than perhaps my case may be ; nevertheless, if *that* can in the least degree promote the cause of truth, and assist your benevolent design, it

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is most heartily at your service. Indeed, I feel myself under so great obligations to the virtues of *Salt of Tartar and Fixed Air*, for rescuing me from a state of misery and pain, and restoring me to the full enjoyment of health and ease, that it would appear the highest ingratitude in me to be silent, whenever it is in my power to do justice to their worth.—It was in the beginning of August 1772, if I recollect right, that I was first attacked with what is called, a fit of the gravel, which lasted about twelve hours; *hinc mihi prima labe*s. As I had till then been quite a stranger to the nature as well as symptoms of the disorder, I was at a loss how to account for the sickness and pains I felt, till a small stone, which came away, too well convinced me from what cause they arose. The continual apprehensions I now was under, of having a return of those pains, and the dread I entertained of being afflicted with a complaint which I had always heard styled the *opprobrium medicorum*, destroyed every comfort, and imbibittered every hour of my life. I did not fail, however, you may be sure, Sir, having recourse

course to the best advice I could find, and took care scrupulously to adhere to every rule and every method of cure prescribed me. I soon perceived, nevertheless, with great concern, that my disorder, instead of abating, gradually increased, conformable to the just observation of Mr. Pope, that

“ The young disease, which must subdue at length,
 “ Grows with our growth, and strengthens with our
 “ strength.”

I now continually voided great quantities of sand, or rather, of very small stones of a bright red colour; and, at the distance of every two or three months, and sometimes oftener, when a larger stone was formed than could easily pass the ureters, I underwent the most excruciating torments before it reached the bladder. The paroxysms, at these times, lasted full thirty hours, and once or twice much longer, attended with an acute burning pain in the region of the kidneys and round the abdomen, a numbness down my thighs and legs, a constipation of my bowels, with violent sickness at my stomach. Castor. oil, fomentations, emollients, and warm bathing,

bathing, which used before to afford me ease in common fits, here often failed of success, and nothing but opiate draughts could administer the least relief. Nor did my sufferings always terminate with the stone's being at length safely lodged in the bladder; for twice, in its endeavours to pass the urethra, the stone unhappily remained fixed there for several hours, and consequently brought on again an intolerable pain, with a total suppression of urine. To attempt giving an idea of what I felt on these occasions, is beyond the power of words; even at this distance of time, while I am now writing, *animus meminisse horret*—it is to be conceived only by those, who have had the misfortune to be afflicted with the stone.

“ As I was convinced that the milder remedies, which I had hitherto followed, were unable to prevent a frequent return of these paroxysms, I determined to have recourse to more violent ones, such as *lixiviums* and *solvents*. Of the former, I preferred that recommended by Mr. *Blackrie*, known before by the name of *Chittick's*
Receipt

Receipt for the Stone. This I took regularly for four months, strictly observing the rules laid down with it. I do not remember I had any very violent attack of my complaint, during the course of this medicine; but it sometimes occasioned me to make bloody water, and I continually voided a good deal of gravel. Perceiving, however, that my health, spirits, and appetite began to be affected by the septic regimen, enjoined to assist the operations of the lixivium, I thought it high time to leave it off; and soon after had the additional mortification to know, that, whilst every thing else, that could render life an object of desire, was about to leave me, my calculous complaints remained firm and rooted as ever.

“ From this caustic medicine, I turned my eyes to *Perry's Solvent*, which, as I found its character and virtues came strongly recommended to the public under the sanction of many very respectable names, I lamented I had not thought of sooner, and considered all the time as thrown away, which I had hitherto bestowed on other
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remedies. My application, however, to this boasted medicine, was followed by no better success than what had attended me before; for at the end of three months, during which time I took it, I found all my fond hopes and expectations at once destroyed by one of the severest fits of the stone I had ever felt. Willing to give this celebrated solvent the fairest trial, I persevered in the use of it long after I found it by no means suited to my constitution, for it induced such a costive habit of body, as rendered my life very uncomfortable, and sometimes was indeed quite alarming.

“ It would be difficult, as well as tiresome, to endeavour to enumerate the variety of other nostrums, which, during the course of full seven years, I was persuaded to swallow :

“ Non, mihi si linguæ centum sint, oraque centum,
 “ Ferrea vox, omnes possim comprehendere formas.”—

Let it suffice to say, that finding from none of them any other kind of benefit than temporary suspensions of pain, I quite de-

spaired of ever meeting with any thing that would afford me essential and permanent relief. At length, however, in the beginning of April 1780, a friend of mine put into my hands your publication, before-mentioned, on Fixed Air: pleased with the account given in it, of the many cures performed by *that* and *salt of tartar*, on putrid and other diseases, and with the great probability of the success of these combined articles in nephritic complaints, as likewise encouraged by the established character and reputation of its amiable author, I determined immediately to make trial of this extraordinary medicine; and accordingly provided myself with a Fixed Air machine, and apparatus necessary for the purpose.

“ About the middle of the same month I entered on a course of the Medicated Water and Fixed Air, taking it in the form and quantity prescribed as in your pamphlet, and soon had great reason to congratulate myself on my undertaking; for in about a fortnight's time I perceived a very sensible alteration in myself, as well
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with respect to my complaint in particular, as to my health in general. The latter I found greatly mended both in my spirits and appetite ; and the uneasy sensations of the former, about the kidneys, were entirely removed. I no longer voided either sand or gravel ; nor did I feel that continual irritation to make water, which I did before ; nor was my sleep disturbed by such frequent, yet fruitless, calls to it ; in short, from the happy enjoyment of ease and comfort, to which I had so long been a stranger, I now seemed to myself quite a new creature.

“ I pursued this method about four months, when my farther progress in it was stopped by a feverish attack, which confined me for three weeks. As soon as that was removed, I had recourse again to the *Salt of Tartar* and *Fixed Air*, and have continued it, with but little interruption, ever since. I can assure you, Sir, with the greatest truth, that from the time I began taking this medicine, to the date of the present writing, I have never had any the least return of my complaint, excepting

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once, about two years and a half ago, I voided a small stone, without pain, about the size of a little pea, or vetch, quite smooth, and almost perfectly round. I have moreover, in every other respect, enjoyed an uninterrupted state of good health. When I am on a journey, or absent from home, when I cannot be supplied with a Fixed Air machine, I neutralize each dose of the medicated water (sweetened with a little sugar) with juice of lemons, before I take it, which has the same effect as the mephitic acid.

“ With regard to regimen, I confess, I observe none, except the avoiding every thing salted or dressed too high. No other restriction of diet can be necessary with a medicine, whose virtues seem best assisted by those things which are, at the same time, most salutary and agreeable to the nature and constitution of the human frame, such as wine, milk, fruits, vegetables, and the like. On this account, the medicine in question has certainly great advantages over those of the caustic kind; for the same reason, perhaps, it may be supposed to
yield

yield to them in *solvent powers*. Nevertheless, if, as experience shews, it *prevents* the *formation* of those substances in the kidneys and bladder, which form the *human calculi*, or the *increase* of them after they are formed, its claim to merit as a *preventative* is equally great; at the same time, when its perfect innocence, nay even beneficial effects on the constitution, are taken into consideration, few people, I believe, will hesitate to pronounce the *Medicated Water* and *Fixed Air* superior to all other medicines hitherto recommended for nephritic complaints. A fair trial of them for three years, will, I hope, fully justify me in asserting this superiority; and if health, ease, and comfort, are blessings we all covet and desire, the having reinstated me in the happy enjoyment of them, when well-nigh lost, must ever intitle the *Salt of Tartar* and *Fixed Air* remedy to my sincerest thanks and most grateful acknowledgments.

I am, dear Sir, with the truest esteem,
 Bath, April 16th, 1783. Your very obedient,
 and very humble servant,
 EDWARD COOPER.
 C 2 “ N. B.

“ N. B. I forgot to mention, that, in the spring of the year 1782, I was seized with a fit of the gout in both my feet, which confined me full three weeks ; nevertheless, I still continued the use of my medicine, adding only to each dose about half a tea-spoonful of rum, nor did I find the least prejudice or inconvenience from it.

Extract of a letter from the Rev. Dr. Cooper to William Falconer, M. D. dated Dec. 18, 1784.

“ All that I have farther to add now, respecting myself, is, that I still continue as well, and as free from any return of my complaint, as I was when I drew up my case in April 1783. I constantly persevere in the use of the alkaline solution with Fixible Air, drinking once or twice a day, as it happens, about two ounces of the Medicated Water, which never fails acting as a preventative, and keeping me intirely free from every the least symptom of gravel or stone ; though I have great reason to think, from the pain I have formerly

merly felt in the region of my kidneys, that a stone is formed in one of them.”—

It may be necessary to remind the reader, that the quantity of alkali contained in the solution used by Dr. Cooper, is double to that used by Mr. Colborne ; so that the two ounces mentioned in Dr. Cooper’s letter as his daily dose, are equal to twice that quantity of the solution directed in the former part of this Work.

The following is an extract from a Letter which I lately had the pleasure of receiving from the Rev. Dr. Cooper.

“ My health is, I thank God, full as good as when you last heard from me, nor have I had any, even the least, return of my old complaint, which I can attribute to nothing but my persevering in a course of the above-mentioned medicine. I pursue the same method of taking it that I have done hitherto, excepting that now, I have seldom recourse to it above once a day, instead of twice, which I formerly had. The effects of it as a preventive I

find equally powerful as they have ever been, and long experience has fully convinced me that this medicine is no less innocent, than it is salutary to my constitution. It is true indeed I have had two fits of the gout, the one in September 1785, and the other in January 1787, but in neither did I desist from taking the Aqua Mephitica Alkalina. On the contrary, I continued it during the whole time of both those severe visitations, and, with the precaution of adding a tea-spoonful of rum or brandy to each dose, found it sit quite easy and comfortable on my stomach."

Dated Sunning,
Apr. 1, 1787.

C A S E IV.

A respectable person of this city, who desired his name might not be made public, aged 65, of a habit of body esteemed to be scorbutic, had been for several years accustomed to the use of medicines that acted upon the urinary organs, as expressed juice of millepedes and tincture of cantharides.

About

About three years ago he was seized with a considerable degree of pain in the urinary passages, and in the rectum. He likewise voided several fabulous concretions, some of the size of a pepper-corn, or vetch, and had frequent returns of bloody urine, in which the proportion of blood was often so large as to coagulate nearly in the same manner as if it was recently drawn from the arm. Great pain, as may well be supposed, attended these evacuations. For these symptoms he took, by advice, Blackrie's lixivium, from forty to eighty drops, thrice a day, in veal broth or onion pottage, and made a large use of onions also in his diet.

His pains and bloody urine increasing under this regimen, he was induced to make trial of honey, which he took to the quantity of near half a pound daily, still continuing the use of the lixivium. The honey seemed to act as a strong diuretic, and to aggravate his pain so much, as to render it necessary to be laid aside, as well as the lixivium. He then made trial of water, simply impregnated with Fixible

Air, for about a month, but without any sensible relief.

He next, by Mr. Colborne's advice, entered upon a course of the alkaline solution impregnated with Fixible Air, similar to that above described, which he commenced somewhat more than two years from the present time, taking eight ounces of it thrice every day. In less than three weeks after his first taking it, he experienced the most essential benefit; his pains abated, his urine became clear and of a natural colour, without any subsidence or precipitation; and his health (some slight pains, occasionally returning, excepted) nearly restored.

It is proper to remark, that the caustic lixivium appeared to have very bad effects on the system, by disposing the humours of the body to a putrefactive state, which was instanced in several respects, and particularly by frequent hæmorrhages from the nose, that occurred during its use; a thing he was never before subject to, and which
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has not occurred since the lixivium has been laid aside.

For the last year and half he has made no bloody urine, has had no pain in passing it, and has voided no calculous concretions. For the last six months he has taken only four ounces three times a day, which is but half the original quantity. It has operated as a gentle aperient, giving one motion daily, but no more, and thus supplying the want of an aloetic pill, which he was formerly obliged occasionally to have recourse to. It had not, however, any sensible effect as a diuretic.

His appetite and health in general have been very good since the use of the medicine. He is now of a healthy and ruddy complexion, hale and strong in his body, appetite and spirits good, bears exercise well in a carriage, and is able to walk five or six miles at a time without fatigue, or any other inconvenience, and generally walks as far daily, whenever the weather will admit of it. I had the satisfaction this day (April 14, 1787) of seeing the
person

person whose case is here described. He is in perfect health, and strong and active for his years, and has had no return of any calculous complaints these two years. He has continued, and still continues to take regularly every day, the mephitic alkaline water.

C A S E V.

The Honourable and Reverend G. Hamilton, of Taplow, in Buckinghamshire, a gentleman between 60 and 70 years old, is another instance of the efficacy of this remedy; as appears from the following extract from a letter of his to George Burges, Esq. of this city, and by him communicated, with the consent of Mr. Hamilton, to Dr. Dobson.

“ I had been troubled with a stone in my bladder about five years, during which time I took various solvents without any effect. In the spring of the year 1780, Mr. Pott extracted a stone weighing two ounces; since that time I have been free from pain, but at times perceived gravel
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in my water, and now-and-then pieces large enough to make me apprehend the forming of another stone. In the winter of the year 1781, I was at Bath, and very fortunately became acquainted with Dr. Cooper. He had been troubled with my complaints, and was taking a medicine he strongly recommended to me. He said, he had taken it near two years, to the best of my remembrance, during which time he had avoided the usual symptoms of this complaint. It was water impregnated with Fixed Air, to two quarts of which he put two ounces of salt of tartar. He took a small quantity of this twice a day, in which he put some sugar, and about two tea spoonfuls of juice of lemons. He very kindly treated me with a glass whenever I called upon him; and as soon as I returned to Taplow, I sent to town for a Fixed Air apparatus. I got it in January 1782, and immediately entered on the course prescribed by Dr. Cooper: only that I drink his two doses at once, and put the juice of half a lemon into mine, as my stomach agrees well with acids. Since I have taken this, I have voided no gravel; nor have I seen any fur on the chamber-pot, its usual forerunner.

“ If this account may be of any service to Dr. Dobson, or his patients, he is welcome to make what use he pleases of it, for I may say with Dido,

Dated Taplow,
Apr. 8, 1783.

“ Haud ignara mali,” &c.

The following is a Copy of a Letter I lately had the pleasure of receiving from Mr. Hamilton.

S I R,

Taplow, April 10, 1787.

“ YOUR letter of the 7th reached me this morning; in answer to which I can inform you, that I continue taking the Fixed Air and Salt of Tartar, and think I find benefit from it. I this winter had occasion to consult Dr. Warren for some complaints, the chief of which was loss of appetite. He advised me to leave off my medicine whilst I was taking his prescriptions; I did so for some weeks, till I found some ugly pains in my back occasioned by some very small stones. This alarmed me, and made me return again to my Fixed Air, which soon relieved me. I recommended it some time ago to a Mr. Wood,

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my hofier in Piccadilly, and to Mr. Charteris at Eton, and they both affure me they have found great benefit from it. I forgot to mention that I voided three of the fmall ftones above-mentioned. If what I have faid will be of any fervice, you are welcome to infert my letter in the new publication you have in hand.

I am, Sir,

Your obedient humble fervant,

G. HAMILTON."

C A S E VI.

William Ainflie, Efq. of this city, a gentleman between 80 and 90 years of age, accuftomed to take much exercife, in hunting particularly, was feized in the year 1780 with a pain and irritation in the urinary paffages, accompanied with a difcharge of blood. This continued eight or nine days, but without his paffing any gravel or fand.

He continued tolerably well (though
not

not without frequent irritations of no great consequence, in which, however, nothing of a calculous nature was voided) until August 1781, when he was again seized with violent pain and irritation, accompanied with bloody urine, which came on after exercise on horseback. After some time his urine became clear, but a violent irritation remained for two or three days longer; nothing, however, of stone or gravel came away.

In January 1782, he came from Dorsetshire to Bath in a chaise, the motion of which renewed his complaints, the irritation particularly, to such a degree, as to make it difficult for him to reach the end of his journey. Soon after his arrival at Bath, he was advised to a trial of Adams's solvent, of which he took somewhat more than a guinea bottle; during the taking of which he thought himself somewhat better, the irritation being rather diminished: but towards the latter end of February he was seized with a great bleeding at the nose, which continued 48 hours, with the loss of some quarts of blood.

The physician he consulted on this occasion advised him to leave off the medicine; but from that time the least motion brought on pain, irritation, and bloody urine, so as to oblige him to stir out as little as possible, since even the motion of a sedan chair brought on the above symptoms.

In this state he continued, although he was still in the course of taking various mild lubricating things, and laudanum occasionally, to abate the pain, until about the beginning of April 1783, when he was advised to begin a course of the alkaline solution saturated with Fixed Air, which he took to the quantity of eight ounces twice a day. He had not taken it more than five or six days, before he found benefit: his pain abated, he became able to walk a little, but much motion still brought on a return of bloody urine, and the other symptoms, but less in degree, and of a shorter continuance than formerly.

By the beginning of May he was so well recovered, as to venture to take a
journey

journey in a post-chaise into Dorsetshire. The first day of his journey he travelled about 25 miles; and the roads being very rough, and the carriage uneasy, brought on a return of his pain and bloody urine. He however went forward about 15 miles the next day, and the roads being better, and the carriage easy, felt no inconvenience. The next day brought him about 25 miles farther, to the end of his journey, where he arrived in perfect ease and health.

About the twentieth of May he began to diminish the quantity of his medicine, taking it once a day only. From this time he remained perfectly well until the beginning of August, when he had a very slight return of pain, which soon ceased. In October following he was able to ride a horse gently for an hour and a half together without much pain or uneasiness; and his water was then, and had been a long time, of a natural colour, plentiful in quantity, and voided without pain or uneasiness.

Mr.

Mr. Ainslie died on the fifth of May 1786, aged 87 years, of a peripneumonic complaint contracted by exposure to cold, but without any symptoms that could be ascribed to calculus, or any disorder of the urinary passages.

C A S E VII.

Mr. John Rolfe of Amesbury, in Wiltshire, was attacked in May 1779 with a fit of the gravel, which lasted near two months, and was at times very painful, and attended with sickness, vomiting, and loss of appetite, which continued until a calculus as large as a vetch came away. He then grew better, and recovered his appetite. Between the time above mentioned, and the year 1784, he had frequent returns of the same complaint, which caused sickness and vomiting in him for a day, and sometimes for two or three days before the gravel came away, which sometimes would be nearly as large as a barley-corn. He drank on these occasions an infusion of marsh-mallow roots, with gum arabic, and other mild softening ingredients, and took

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castor oil occasionally. On Saturday Nov. 13, 1784, after being warmed with hunting, he became on a sudden cold and chilly, with aching pains similar to those of the rheumatism in his sides, breast, back, and limbs, which continued several days, and seemed rather to increase. On the 22d of the same month he felt some pain in his stomach and bowels, and applied on that occasion to his apothecary, who gave him some opening physic, which operated very properly downwards, but caused sickness and vomiting. This induced him to think his disease to be of the bilious kind; and in consequence thereof he took some remedies which gave him some relief, but did not remove the pains in his back, breast, &c. Having at that time some business in Dorsetshire, he thought the journey might be of service to his health, and on Thursday the first of December he went to Salisbury, and from thence to his friend's house in Dorsetshire, which was about thirty miles distant from the last-mentioned city. This journey, which he performed in one day on horseback, increased his pain so much, that it was with difficulty he got to the end of his journey.

The next day he was better, but not free from the pains above-mentioned, his appetite also was very indifferent, his body costive, and his stools hard and black. In this state nearly, he continued until the tenth of December, on the evening of which day he was seized with sickness at his stomach, and a vomiting of blood in considerable quantity; the night following he was again seized with the vomiting of blood, on which Dr. Pultney of Blandford was sent for, who recommended to him some medicines, that stopt the bleeding. He continued at his friend's house until the last day of December, when he returned home, with his pains much as before, and his health very indifferent. After he had been at home about eight or ten days, he passed a stone much larger than any he had before done, being of the shape of a barley-corn, but larger. After this he found his health and appetite better. After a few days however his stomach became again painful, sore and tender, and often subject to vomiting, and it was with difficulty he could bear the motion of a post-chaise. His complaint being now judged to be a combination of bile, rheumatism,

matifin, and gravel, he was ordered to Bath, where he arrived May 5, 1785. Dr. Adair was sent for a few days after his arrival, who directed him some medicines, and a cautious trial of the Bath waters. His health however not improving, his medicines were altered, and a blister applied to the stomach, which soon became easier in respect of pain, but his other pains in the back, breast, &c. remained as before, and his sickness and vomiting continued. Dr. Falconer was consulted about this time, who, in conjunction with Dr. Adair, advised him to try the alkaline water with Fixible Air, to be taken in the quantity of a pint a day, divided into three doses, and to use the warm bath twice a week. He had not taken the alkaline water above two or three times, before he found his appetite mended, and his pains rather abated. After continuing this course for three weeks, his stomach became settled, his appetite returned, his sickness left him by degrees, and his vomiting ceased entirely; and from that time he continued in perfect health, and free of all gravelly complaints. During the last illness that he had, his urine was of a deep colour, and notwithstanding
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he made but a small quantity in the course of a night, it left a great sediment in the vessel. But from the time he began to drink the alkaline water, his urine became pale, came away freely, and in large quantity, and left not the least fur or discoloration on the vessel. *The above account is taken from a letter of Mr. Rolfe to me, and expressed as nearly as possible in his own words. The letter is dated from Amesbury, Oct. 19, 1785.*

I have since the time above specified had the pleasure of the following account from Mr. Rolfe, dated Amesbury, Jan. 30, 1787.

“ I should sooner have given you a line respecting my health, had it been otherwise than well. It is at present so good, that I do not remember it to be better; though I have voided a stone in the course of the last summer, in a decayed and crumbling state, as it fell to pieces by the pressure of my fingers. I account for my having this stone by my having in April last broken my glass apparatus, and my

not being able to get another for the space of a month ; and in this interval I apprehend the stone was generated. I still continue the alkaline water impregnated with Fixible Air, taking about one third of a pint three times a day.”

C A S E VIII.

Lieutenant-colonel Gould, aged 55, formerly of the third regiment of guards, was subject to gouty attacks at little more than thirty years of age, which have, at intervals, attacked him ever since. About 19 years ago, he was taken with frequent stoppages of urine, that would sometimes continue three or four hours, and were not relieved but by the use of a bougie, which he was obliged frequently to have recourse to, and once even to wear one constantly for two months together. These fits at first had long intervals, but of late years have become more frequent. His urgings to make water were so frequent, that the retaining of it was very difficult, and often impracticable. His urine was mostly turbid, and had a strong tendency to putrefy, and had an evident sctor of that kind
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when voided. He used also to pass a large quantity of mucus in his urine, insomuch, that it would stand nearly one inch deep in the pot, when there was no more than a pint and half of water. He has at times passed red gravel, but never any of such a size as could be called a calculus. He had considerable pain and sensation of weight in the hypochondria, which sometimes extended to the back. At the time of making water he had an inclination to go to stool. When the gout was in the extremities, he was generally free from these complaints. About March last, 1785, he made trial of a vegetable diet of rice milk, mashed potatoes, turneps, &c. and drank no fermented liquor, but barley water only. After continuing this regimen about three weeks, he was seized with a smarting pain in the urethra, and passed about half a pint of blood daily for two days successively. Opiates, spermaceti draughts, with a change of diet to one of animal food, and the moderate use of wine, relieved these symptoms, which were followed by a slight fit of the gout. During the summer, air, and moderate exercise on horseback daily for six weeks, amended his general health, but

his urine still continued turbid and foetid, About the latter end of August last, he had a slight, and favourable fit of the gout, which lasted about three weeks. His urine, however, continued as before. On Friday, October 7th, he began, by Mr. Colborne's advice, to take the aqua mephitica alkalina, of which he drinks about one third of a pint twice a day : he takes it with a little hot milk, and it agrees perfectly with his stomach. His hours of taking, are about two in the afternoon, and about six in the evening. It tends to keep the body regular as to stools, but has no farther purgative effects. It has shewn no stimulating effects upon the urinary passages, as his wants in that respect are much less frequent than formerly. In five days time after he first took it, his urine began to grow clear, and void of mucus, or foetor ; and to be easily retained. He can now keep it three or four hours, and passes it, though not without pain, with much less than he formerly did. It is of a moderately pale amber-colour, void of smell, and will keep twenty-four hours, and probably would much longer, without suffering any change, and leaves no fur on the

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the chamber-pot. His health and appetite are much better, since he took this remedy, and his strength and ability to walk much improved. His regimen of life has been fish or plain meat, with half a pint of red port wine, or perhaps more, and it has agreed well with him. He has taken fruit at times, but thought it disagreed with him.

The above account was taken down from colonel Gould's own mouth in the month of January 1786. But although the mephitic alkaline water gave great relief from pain by abating the acrimony of the urine; yet it appeared that the bladder and urinary passages, and indeed the constitution itself, were so injured and weakened by so many repeated attacks in a long course of years, as to be irremediable. He died of an internal mortification in the winter of 1786.

C A S E IX.

Mr. Francis Loftus, of Market-Weighton, in Yorkshire, a person of sixty-seven years of

of age, and good constitution and general state of health, except with regard to this particular complaint, had been twice cut for the stone, the last of which operations was performed somewhat more than eight years previous to the writing of his first letter to Benjamin Colborne, Esq. which bears date Jan. 27, 1786. He there mentions that he is satisfied that another is formed in his bladder, and though he does not there mention the symptoms that induced him to be of that opinion, it may reasonably be presumed that he must, from sad experience, be sufficiently qualified to decide upon such a question. Having seen in one of the monthly publications an account of the success of the aqua mephitica alkalina, he made trial of it according to the receipt there put down, which by mistake directed two ounces of salt of tartar instead of one, to be dissolved in two quarts of water. This he tried for near six weeks to a pint and half daily, but without any abatement of his symptoms, save that his water, which was before turbid, and deposited a sediment that adhered to the vessel, became almost clear.

Mr.

Mr. Colborne, however, having informed him of the mistake in the printing the receipt, and advised him to make trial of a solution of half the strength only, he in his next letter, dated March 7, 1786, gives a more favourable account. His pain in passing his water was abated, and he was able to retain it longer. He adds in this letter, that the stone was an hereditary complaint in his family, that his father had it, but did not live to be cut. His next letter, dated June 7, 1786, contains little more than an account of his farther amendment in general terms, and a confirmation from examination of his having a calculus formed in his bladder. His urine, he adds, is still rather foetid. His next letter, dated July 25, 1786, gives a much more favourable account. He there describes his pains as having subsided, his urine having lost its foetor, and his health being perfectly restored. He adds that he could then walk three or four miles *with a great deal of ease*. He had also left off his opiate as being unnecessary. The mephitic alkaline liquor he says never purged him, but kept his body moderately open.

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His next letter, dated October 6, 1786, confirms the opinion of the efficacy of the medicine. He there says that his health is strong and good, and superior to what could be expected at his time of life, and that he had just walked four miles without the least inconvenience. A subsequent letter, dated January 9, 1787, is to the same purpose. He expresses himself as being “in great good health and spirits, and surprisingly strong, quite free from pain, and able to walk three or four miles with pleasure.” He adds, that he now takes the water only twice a day, and finds that answer his purpose perfectly well.

C A S E X.

William Melmoth, Esq.* a gentleman now at an advanced period of life, was, many years ago, subject to violent pains in the back on much walking, which he attributed to weakness induced by profuse discharges of blood by the bleeding piles;
a com-

* Author of the Translation of Pliny's and Cicero's Epistles.

a complaint under which he had laboured several years. During the time of his being subject to the above-mentioned disorder, he once or twice, after exercise on horseback, made some coffee-coloured urine. About sixteen years ago, he had an attack of a gravelly complaint accompanied with calculous discharges. This recurred at longer or shorter intervals, and attended with more or less pain, until a period of about 15 months preceding the present time, when he first had recourse to the mephitic alkaline water. Of this he took about half a pint daily, of the strength mentioned in the former part of this work, and persevered in this course for about a month or six weeks. During this space he always discharged with his urine pretty large and numerous particles of coagulated blood, but without any pain. This appearance caused him to suspect that the medicine operated upon the urinary passages with too great violence. On this presumption he gradually reduced the strength of the solution, and at last found that three drachms of salt of tartar dissolved in two quarts of water, was the proportion that agreed best with him. Specks of blood

are scarcely now ever to be seen in his urine. Of the preparation above-mentioned he takes, and has for some months taken, about half a pint daily, and often a less quantity. Mr. Melmoth's health is much better now than it had been for several years previous to his trial of the above-mentioned remedy, and his strength much restored. He is also at present able to walk about the town without exciting any gravelly symptoms, which formerly were excited by very slight motion, inasmuch, that he could scarcely stir out of doors without using a sedan chair, which is now no longer necessary on that account.

Mr. Melmoth has always taken, as well during the use of the mephitic alkaline water as before, a moderate proportion of vegetables, and such other acid substances as are usually eaten with animal food, and has used for drink at meals two or three glasses of wine, and now and then a little ale or porter. He has never found the mephitic alkaline water to disagree with his stomach in any respect. In very cold weather he sometimes puts into his cup a single tea-spoonful of brandy.

CASE

C A S E XI.

Mr. Patrick Westoby of Gainsborough, in Lincolnshire, a person now advanced in years, was, one day in the summer of 1776, seized with a sudden stoppage of urine, whilst he was passing his water freely. This continued a few minutes, and was not attended with much pain. To relieve this he took, as soon as it could be got, an infusion of Burdock, with the addition of some milk, and a little honey, which passed off freely in the night following by urine, and brought with it a small round calculus, flat on one side, and with a little rising on the other, and about 1-5th of an inch diameter. He then continued free from any complaint of this kind about a year, after which interval he was again attacked with frequent urgings to make water, which he passed in small quantities at a time, and with some, though but little pain. For these complaints he had recourse again to the infusion of Burdock root, but did not find the same ease from it as before. That year and the follow-

following he took a considerable quantity of Adams's solvent, but did not experience any relief from it. For the two or three years next succeeding, he usually had, in each, two or three attacks, but they were moderate, and relieved by gentle diuretics with the addition of opiates. During the two years immediately preceding his last attack, his paroxysms were less frequent, but more urgent, and attended with more bloody water, and more frequent excitings to pass his water, and greater pain in the urinary passages, which continued to be very troublesome for some nights, but went off in the space of two or three weeks. On the 3d of February 1785, when the frost was very intense, he had a smart attack attended with many urgings to make water, which he did about thirty times in the course of the night, and passed his urine tinged with blood. In a few days however these symptoms abated, and his urine flowed freely and plentifully, and became of a good colour, and passed without pain. During the time he was in bed he was subject to a flow of pale clear water, which caused such quick returns of inclination to pass it, as interrupted his sleep

sleep very much. The bark in infusion, and opiates removed this symptom, and in about a month all his complaints ceased.

In the month of August following he had another attack, which continued about three weeks, and another towards the latter end of the month of October, which continued, with two intervals of 12 days each, to the 18th of January 1786. The weather was then very severe, and his disorder never more troublesome, his urine bloody; with frequent urgings to pass it; pain and irritation in the urinary passages, and no sleep but with opiates. He began that day about noon to take the mephitic alkaline solution, and continued to take it regularly, according to the directions in the Appendix to Dr. Dobson's work, for four or five days, but without any perceptible alteration in his symptoms, except that his urine became a little clearer. On Sunday, January 22, he passed the day and night in great pain; but on the Monday and Tuesday after, he observed a brown powder at the bottom of his chamber-pot, in quantity nearly sufficient to cover a shilling,

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which

which he thought proceeded from the dissolution of a calculus. He then became somewhat easier, but remarked, during two or three of the evenings preceding, that he felt some pain in the back, os pubis, and thighs a little below the hips, all of which were new symptoms. From Wednesday morning his symptoms began to decline, his water passing freely, and being of a good colour; his irritations of the passages abating, and his urgings to pass it returning less frequently. During this time he observed in his urine what he took to be fragments of a calculus. Before he took the mephitic alkaline solution, he took a diuretic pill of oil of juniper, gum arabic, and uva ursi, during the use of which his urine was red, thick, and turbid, and deposited a sediment that adhered closely to the pot. His disorder continued to abate until February 7, 1786, when he had another attack attended with pain, and some bloody urine which lasted a few days. His urine after this attack became again pale and clear; but nevertheless was voided in small quantities, and attended with some pain. He then, by Mr. Colborne's advice, diminished

nished the quantity of the solution that he took daily, and added a few drops of laudanum to each dose ; which abated his sensations of irritation in the passages, and his urine soon became clear, and void of mucus or blood, was voided without pain, and easily retained. In June 1786, he was so far recovered as to be able to walk three miles a day without pain, feeling nothing more than a slight obtuse sensation at the time his last drop of urine came away. His urine deposited, on standing, a considerable quantity of a white adhesive sediment, and sometimes small bits like broken shells. From this time to April, 1787, he went on taking the mephitic alkaline solution in about two-thirds or one-half of the dose directed in the Appendix, and has felt no return of his complaint, except once, which he ascribed to the breaking of the machine, which prevented his taking his remedy for about seven weeks, after which he had a moderate fit, attended with frequent excitements to pass urine, but not much pain. The mephitic alkaline water being again procured abated these symptoms, and carried them all off in about a fortnight.

At present, April 4, 1787, he is free of all pain and irritation, or other symptoms of calculus.

C A S E XII.

A servant of Charles Sheppard, Esq. of Castle Godwin, near Painſwick, Gloucestershire, was, about the month of October 1785, taken with a suppression of urine, and obliged to have recourse to a catheter, in the passing of which, a stone was discovered in his bladder. This necessity recurred two or three times during the winter, and the poor man, in consequence of this complaint, was rendered incapable of labour, and even unable to walk a very few yards without making bloody urine. He had also a constant discharge of mucus by the urinary passages. In May 1786, he began to take the mephitic alkaline water, and before he had taken it a fortnight, he found relief, and in about six weeks could walk, or ride on horseback without any discharge of blood, and the mucous discharge was much lessened. During the course of last winter he had one or two attacks,

attacks, which were apprehended to proceed from his drinking cyder; his state of health is now easy and comfortable, has walked ten miles, and rode eighteen with much ease. Can work whole days in the garden, but is cautious of any violent exertion, as he sometimes feels the stone as a weight, and has frequent calls to make water, and sometimes has a mucous sediment in his urine. *Taken from a letter of Charles Sheppard, Esq. dated Castle Godwin, April 11, 1787.*

C A S E XIII.

The Rev. Arthur Evans, about 50 years of age, and of a scorbutic habit of body, has been for some years afflicted with frequent nephritic complaints. In November 1785, he was seized in a most violent manner, with repeated vomitings and pains in the kidneys. In December following he came to Bath, and having the pleasure of Mr. B. Colborne's acquaintance, he consulted him, who kindly gave his advice, and recommended the immediate use of the mephitic alkaline water, advising three or

four spoonfuls of boiling milk to be mixed in the water till the stone had passed; half a pint was drunk every day according to this direction. In a week from the first drinking, an oblong stone of the size of a small kidney bean was passed with little pain; it was, three weeks and five days from the first seizure to the passing of the stone. Mr. Evans persevered in taking the same quantity of mephitic water daily (without milk) till June 1786, when he left Bath, and soon had the misfortune to break his machine, which deprived him of the mephitic water full three weeks; the consequence was that towards the latter end of August he had a return of his nephritic complaint, but no vomiting: in a few days afterwards he voided a few calculi, when these had passed, he soon became easy, and remained perfectly free from that complaint till February last, when he was suddenly seized with frequent vomitings and pains in the kidneys: these nephritic symptoms came on in the evening, and early in the subsequent morning a small stone was passed, which Mr. Colborne, on examining, thought was rather a fragment of an old
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AQUA MEPHITICA ALKALINA. 71

one than a new concretion ; as Mr. Evans had not omitted drinking daily half a pint of mephitic water from August to February last, from which last period Mr. E. has had no complaint of a nephritic nature.—The foregoing account is given in Mr. Evans's own words.

Bath, April 23, 1787.

C A S E XIV.

The following case is that of M. S. Branthwayt, Esq. of Taverham near Norwich, as related by himself.

“ In June 1785, I was seized with a slight fit of the gout, and during the time the gout was upon me, I felt a violent pain quite round my body, but more particularly in my right kidney, attended with a frequent inclination to make water, which passed from me very slowly, and with much pain. At this time Mr. B. Colborne of Bath came to visit me, and upon inspecting my chamber-pot, found that my water was coffee coloured, and from my description of the symptoms I had felt, suggested

gested to me that I had the stone. Fortunately Mr. Benj. Colborne had a small travelling apparatus with him to make the aqua mephitica alkalina : he made me some, and after I had taken 4 or 5 doses, my urine passed more freely, and with less irritation, and became perfectly clear. When he left me, I was without the aqua mephitica alkalina three weeks, in which time I voided a small stone, and some red gravel, and my urine became turbid, and gave me infinite pain in passing. In the space of two or three days after, I began again to take the aqua mephitica alkalina ; my water became clear, and passed without irritation, and I continued entirely free from all symptoms of the gravel, and was in better health than I had been for some time before. Indeed, feeling so perfectly well, I left off the water for 5 or 6 months, when I was again attacked with a violent pain in my right kidney, attended with fever and sickness, which lasted two or three days ; but not suspecting it was the stone, and finding myself very well again, I did not take the aqua mephitica alkalina till after I was a second time attacked in
the

AQUA MEPHITICA ALKALINA. 73

the same way, but more violently. I then took the water again, and was perfectly well till September 1786, when I voided a stone about the size of a vetch, and since that time I have never left off the aqua mephitica alkalina, nor have I had any symptoms of the gravel or pain in my kidney.

Taverham, near
Norwich.

M. S. BRANTHWAYT.

“ Finding so much benefit from the aqua mephitica alkalina, I recommended it to a poor woman in my parish (by name Kidd), who has been afflicted with the stone and gravel at different times between 20 and 30 years, during which time she has voided many small stones. This poor woman being always an invalid, passing by her door, I called to ask her how she did, and found her very ill with a nephritic complaint. I made her some mephitic alkaline water, and after taking a few doses she was much relieved, and continued mending for three weeks, when she voided two stones, one near an inch long, the other about the size of a pea, weighing together 24 grains.

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She

She continued drinking the water some time after, during which time she had no return of her gravelly complaints, and thought herself in better health than she had been in for many years. I tried to persuade her to continue the aqua mephitica alkalina; but she said she had no symptoms of gravel, and was very well, therefore I could not succeed.

M. S. B."

CASE XV.

Mr Adrian Abbot, Cabinet-maker, being in London in the year 1775, and employed in his business, whilst he was carrying a coffin, it being high above his head, it struck against a building, and strained him in the small of his back. Three days after this accident he passed a considerable quantity of blood as he went to make water. From that time to the year 1783, he had frequent inclinations to pass his water, and a constant pain in the small of the back, and frequently a mucous discharge of a light yellowish colour, if he exerted his strength

strength to any considerable degree. Some time afterwards he was seized with a total stoppage of his urine, for which he was bled by the advice of a surgeon, and took medicines, and in about a week his urine passed easily. About six months afterwards he had another attack of the same kind, which, when it abated, was attended with a large discharge of blood, which became from that time a frequent symptom. At this time it was the opinion of two surgeons who attended him, that he had a stone in his bladder. He continued in this state, with great pain in his back, and frequent inclinations to pass his urine, until December 14, 1786, when being worse, he applied to a surgeon, who directed him some medicines, but without success. He then applied to another gentleman of the profession, who advised him to submit to be cut. His urine at this time was foul and turbid, and changed the vegetable blues to a red colour.

On the 27th of January he was directed to Mr. Benjamin Colborne, who gave him some of the mephitic alkaline water,

water, with directions how to take it. His urine soon became clear and transparent, and he could retain it a long time, and for many nights had occasion to make water once only. The pain in his back ceased, and at present (April 20) he has no complaint of any kind.

C A S E XVI.

A tradesman of this city of the name of Roffe, had for many years been troubled with a stricture, occasionally, of the urethra, which caused frequent obstructions to the passage of his urine, for which he was obliged to use bougies, which gave him great pain without producing any permanent relief. During the spring of the year 1785, his complaints returned so frequently, and with such violence, that it was not practicable to pass a bougie. In this melancholy condition nothing but opiates afforded him any relief, which were obliged to be large in quantity, and frequently repeated. In the month of May in the same year, he had an abscess in perinæo

rinæo formed, which discharged a large quantity of matter, and healed in about a month's time. His difficulty however of passing his water continued, and his urine was loaded with mucus. Nearly in this state he continued until the eleventh of December 1786, when he began to take the mephitic alkaline water.

At that time his urine came from him drop by drop, and was so overcharged with mucus that it adhered to the pot in such a manner, as not to fall out when the vessel was turned with its mouth upwards. Its smell was also so rank and foetid, as scarcely to be borne, and was so alkaline with the putrefaction, as to ferment with oil of vitriol, and to change paper stained with juice of turnsole to a blue colour. His pain was likewise so great as to oblige him to take opiate pills every three or four hours. He began the use of the mephitic alkaline water by taking it with milk as before directed, and with some drops of laudanum in each dose. He took it every eight hours, and in the space of twenty-four hours, he passed his water much easier,

easier, and his irritations were less frequent and violent, and his urine came away in larger quantities at a time. By continuing his medicine he was able, in three or four days time, to take it without the laudanum, and to go about his business, which is that of a shoe-maker, and to work at it much better than he had been able to do for several years. Since the above-mentioned time, he has had little or no return of his complaints, and is in every respect better in health than he has been for the last seven years. Before he took the alkaline mephitic water he was not able, even when he thought himself tolerably well, to work at his business for two days together. Although this man has taken the alkaline mephitic water for four months, it seemed to have very little effect on a fragment of the same calculus, mentioned in the experiments before related to be made with urine. Yet it, appeared to be of an alkaline nature by its changing paper stained with juice of turnsole to a blue colour.

C A S E XVII.

———— Telling, a glazier of this city, had been for two or three years subject to strictures of the urethra, which produced frequent suppressions of urine. About ten months ago from the present time, May 1, 1787, he was taken ill in the last-mentioned way, and continued without passing any water for two days, in which he suffered the most excruciating pain. A bougie was passed which produced a discharge of urine for the time. He had frequent returns of pain of this kind, but not so violent, and was never easy two days together. When he went to make water he had in general a tenesmus, and in the morning his urethra used to be greatly clogged by viscid mucus, which delayed his urine passing, and frequently produced a temporary stoppage. His urine was foul in appearance, and of a wheyish colour, with gravel in it, and made in small quantities.

After

After taking the alkaline mephitic water for three or four days, his urine began to pass more freely and easily; and his complaints mended daily. He has now taken the mephitic alkaline water for two months, has no tenesmus on passing his water, can retain it well, and pass it in large quantity, and the mucus is but little; and that of a thin consistence compared to what he formerly voided. He eats, drinks, and sleeps well, is able to labour in his business, and is upon the whole in better health than he has been for several years.

Several other accounts of the good effects of the above remedy have been received, but as the persons who were benefited would not permit their names to be mentioned, they are not here put down:

It was my intention to mention none, but such as would permit their names to be vouched for the truth of the narrative of the relief gained, and this is only departed from in a single instance (Case IV.) which would not have been inserted had not the person and his situation been well known

known to numerous inhabitants of this city.

I would farther mention, that I have been informed from the most unquestionable authority, that the mephitic alkaline water has been of the greatest service in a case of violent strangury, without any suspicion of calculus, which returned about every ten or fourteen days. It prolonged the intervals to several months, abated the violence of the pain, and diminished the heat of the urine.

E X P E R I M E N T S

*On the solvent effects of the Alkaline Solution,
saturated with Fixible Air.*

By BENJAMIN COLBORNE, Esq.

A FRAGMENT of a calculus of an ochrous colour, and rough on the outside like a mulberry, weighing fifty-one grains, was put into about two ounces and a half of the mephitic alkaline solution, and corked up. After two days standing, the solution was poured off, and a fresh portion put on, and this was repeated every day, or every other day, for thirty-one days successively.

At the end of that time the stone was again weighed, and found to have lost thirty-six grains of its original weight.

Another fragment of the same calculus, weighing 41 grains, treated in the same manner, lost in thirty-seven days thirty-two grains.

Another

Another fragment of the same, weighing fifty-four grains, treated as above-mentioned, lost in thirteen days thirty-two grains.

Another fragment of a calculus, of a light ochrous colour, and close texture, weighing forty-one grains, lost by the same treatment in thirty-three days, eleven grains only.

A smooth white calculus was sawn into two pieces, one of which weighing 29 grains, was put into the alkaline solution, but imperfectly saturated with Fixible Air; the other, weighing 20 grains, was put into an equal quantity of the solution perfectly saturated; after standing 28 days, the first had lost six grains, the other eight grains.

A human calculus was divided into four parts, the first, No. I. weighing 20 grains, was put into the saturated alkaline solution, made of the common salt of tartar of the shops; the second, No. II. weighing 19 grains, was put into a similar solution made with a proportionable quantity of the

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oleum tartari per deliquium; the third, No. III. weighing 18 grains, was put into an alkaline solution made with salt of tartar procured from Apothecaries Hall; and the fourth, No. IV. weighing 18 grains, into an alkaline solution made with the caustic lixivium, neutralized by means of Fixible Air, and as nearly as possible of the same strength with the others. After standing 45 days, No. I. had lost 13 grains; No. II. 13 grains; No. III. 14 grains, and No. IV. 11 grains.*

A piece of calculus, weighing 51 grains, put into the neutralized alk. solution, made with lixiv. tartari, lost in 18 days 29 grains.

Another piece, weighing 56 grains, put into an alkaline solution made with fossil alkali in the same proportion, and neutralized in like manner, lost in 18 days 13 grains.

Another piece, weighing 55 grains, put
into

* *N. B.* These different alkalies were tried to discover, if one alkali had a greater power than another.

AQUA MEPHITICA ALKALINA. 85
into a neutralized solution made with salt
of tartar, lost in 18 days 11 grains.

Another piece of calculus, weighing
41 grains, put into a neutralized alkaline
solution, lost in 31 days 30 grains.

Another piece, weighing 49 grains, put
into a neutralized solution made with salt of
tartar, lost only four grains in the same
time.

A piece of calculus, weighing 56 grains,
was put into a neutralized solution made
with fossil alkali, in 31 days it lost 18
grains.

Another piece that weighed 64 grains,
put into a solution of only half the strength,
made with lixiv. tartari, lost in 31 days 42
grains.

The calculi above-mentioned were cor-
roded in holes like a worm-eaten piece of
wood, but externally preserved their ori-
ginal figure, till they all at last fell to
pieces.

ADDITIONAL EXPERIMENTS.

By the Same.

EXPERIMENT I.

October 16, 1786. A fragment of a hard, close-grained human calculus, weighing fifty-five grains, was put into a large wide-mouthed vial, and upon it was poured *daily* the first urine that was passed, after taking a dose of the mephitic alkaline water, by a person that was in a course of taking it every day. The vial was set in a moderately cool place, and the urine regularly changed.

	Lots of Weight.	Weight of the Remainder.
From the 16th of October to Nov. 16, it lost - -	2 gr.	53 gr.
From Nov. 16, to Dec. 16 -	7 gr.	46 gr.
From Dec. 16 (1786) to Jan. 16 (1787) - - -	10 gr.	36 gr.
From Jan. 16, to Feb. 16. -	10 gr.	26 gr.
From Feb. 16, to March 16 -	4 gr.	22 gr.
From March 16, to April 16	4 gr.	18 gr.

EXPE-

EXPERIMENT II.

Another fragment of the same calculus was put into a wide-mouthed vial, and upon it was poured every day the urine of a healthy person who never had any signs of gravel, and who was not in the habit of taking any medicine whatever. The calculus weighed when the urine was first put upon it, 45 grains.

	Loss of Weight.	Weight of the Remainder.
From October 16th, 1786, to Nov. 16th, —	0	45 gr.
From November 16th, to December 16th —	0	45 gr.

About the latter end of December, the urine was neglected to be changed, and the same urine remained upon the calculus until January 26th, in which time the fluid had become very foetid, and alkaline. The calculus had, during this time, fallen into three pieces, and had lost in weight ten grains. From that time the urine was changed regularly every day. On the twenty-sixth of January, the fragments of the above calculus weighed 35 grains.

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From

	Loss of Weight	Weight of the Remainder.
From January 26th, to Feb. 26th, ———	0	35 gr.
From February 26th, to March, 26th, ———	Gain of Weight gr. 1fs.	36 $\frac{1}{2}$ gr.
From March 26th, to April 26th, ———	2 $\frac{1}{2}$ gr.	37 $\frac{1}{2}$ gr.

EXPERIMENT III.

January 24th, 1787, an entire calculus of a white colour, and sixty grains in weight was put into a wide-mouthed vial, and on it was poured every day some of the urine of a person who was in the habit of taking the mephitic alkaline water in the same manner as is mentioned in Experiment I. and the urine renewed daily. In the space of two months, the calculus was diminished in weight eight grains, and in another month the whole diminution was twenty-five grains. The laminæ that form the calculus also began to separate, and it appeared, that the action of the solvent had penetrated much deeper in one part than another,

EXPE-

EXPERIMENT IV.

A fragment of another very hard red calculus, which weighed fifty-four grains, was treated in the same manner, and for the same time as in the last experiment. It lost in that space of time seventeen grains.

Observations on the symptoms attending persons afflicted with Calculus, and on the effects of the Mephitic Alkaline Water.

By the same.

Urine in general will change paper stained with juice of turnsole to a red colour, which will be permanent; but the urine which is first made after taking the mephitic alkaline water, will change the turnsole paper to a blue colour. This will take place even if the mephitic alkaline water be taken not more than a quarter of an hour before the discharge of the urine.

If the mephitic alkaline water be saturated

rated with fixible air, it will not produce any immediate change on the turnsole paper, but after a short exposure to the air, the paper will become blue, as the superabundant quantity of fixible air flies off.

The urine of almost every person in health, if suffered to remain for twenty-four hours in the chamber-pot, forms more or less incrustation on the bottom and sides. This, however, I believe never takes place in the urine of those who are in the habit of taking daily a competent dose of the mephitic alkaline water.

Persons subject to the stone or gravel, ought accurately to observe the state of their chamber-pot, whether it keeps free of fur, or other adhesion to its bottom and sides; this being the principal criterion, by which the increase or amendment of the complaint can be ascertained.

If no discolouration of the vessel appears after the urine has stood in it for some time, and particularly if the urine clears
away

efficacious in obviating the acrimony of the urine, it seems likely to be of service if given immediately after the operation of lithotomy has been performed, as it is well known that the healing of the wound is often much retarded by the irritation of that discharge, which is more likely to be troublesome in this way, as it is in its own nature more acrimonious.

Schirrosities of the os uteri and of the prostate glands, by retarding the passage of the urine, often produce symptoms similar to those that arise from calculus. One difference however may be remarked, which is, that people who have such schirri, bear the motion of a carriage or of a horse better than is done by those who have calculus; and if they void mucus, it generally comes away with the last drops of their urine, and the pain they feel lasts in much the same degree, during the whole of the time the urine is passing, which is seldom the case in calculous complaints; as the pain in them is generally most acute, just as the last drops are discharging.

People

People who have ulcers in the urethra attended with stricture, generally void purulent matter previous to the coming away of the urine, which last, by being long retained, sometimes causes abscesses in the perinæum and suppressions of urine.

I have known persons, of both sexes, advanced in life, complain for many years, of frequent urgings to make water, which comes away by little at a time, and is generally of a wheyish appearance, and after standing twenty-four hours, deposits a large mucous sediment. Sometimes a suppression takes place. All the cases of this kind in which the mephitic alkaline water was tried, found more or less relief, one only excepted, which on examination proved to be a schirrus of the os uteri.

In violent paroxysms of the stone or strangury, I have advised the use of opiates combined with the mephitic alkaline water. Fifteen or twenty drops of the thebaic tincture may be taken in a quarter of a pint of the water, and occasionally repeated. A bag of oats heated in boiling water,

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I have experienced to be a convenient and safe method of applying a fomentation to the os pubis, and what generally gives ease. A clyster also of two ounces of olive oil, and forty drops of the thebaic tincture, may be injected and retained for several hours. If nevertheless the mephitic alkaline water should prove too stimulant to be repeated during the fit, which seldom happens, barley-water, with gum arabic, may be substituted in its place; and when the pain has subsided, recourse may again be had to the mephitic alkaline water.

The following experiments were made by myself on the same subject.

Two calculi of a similar appearance, of a whitish colour with a pink tinge, and of such a consistence as to be easily scratched with the point of a knife, the one weighing five grains, and the other two grains and a half, were put into six ounces of the alk. solution, as above; in 38 days, during which time the solution was changed six times, they were diminished in weight five grains and a half, but the apparent size
was

was little less than at first; they were however so friable as to fall to pieces on slight touching.

Two other small calculi similar in appearance to the others, and both weighing six grains and a half, were treated in the same manner. In 38 days they were both of a scaly appearance on the outside, and of a hollow worm-eaten texture within, and withal so shivery, as to fall to pieces on slight pressure. The pink tinge on the outside was much diminished, but was retained within. The weight was only gr. i fs. so that they had lost 5 grains.

Six small calculi similar to the foregoing, and weighing gr. iv. fs. were treated as above. In 38 days they had lost three grains and three-fourths, and were so fragile as to fall to powder on being touched.

COMPARATIVE TABLE

Of the solvent powers of the Alk. Solution, saturated with Fixed Air, with water simply impregnated with Fixed Air.

Mr. Colborne's Experiments with the Meph. Alk. Water.

Original weight of the calculi.	Time they continued immerfed	Weight loft by the calculi.
51 grains.	31 Days	36 grains.
41	37	32
54	13	32
41	33	11
20	28	11
51	18	29
55	18	11
41	31	30
49	31	4
64	31	42

Mr. Colborne's Experiments with the urine of a person who was taking the Mephitic Alkaline Water.

Original weight of the calculi.	Time they continued immerfed.	Weight loft by the calculi.
55 grains.	182 Days.	37 grains.
60	90	25
54	90	17

EXPE-

EXPERIMENTS I made myself with the
Mephitic Alkaline Water.

Original weight of the calculi.	Time they conti- nued immerfed.	Weight loft by the calculi.
$7\frac{1}{2}$ grains.	42 days.	$5\frac{1}{2}$ grains.
$6\frac{1}{2}$	48	5
$4\frac{1}{2}$	48	$3\frac{1}{2}$

EXPERIMENTS made by Dr. Percival on
the diffolvent power of water, fimply im-
pregnated with Fixible Air, on human
calculi.

See Percival's works, Vol. III.

Original weight of the calculi.	Time they conti- nued immerfed.	Weight loft by the calculi.
152 grains.	2 Days.	$2\frac{1}{2}$ grains.
165 $\frac{1}{2}$	2	11
126 $\frac{1}{2}$	2	gr. $\frac{1}{2}$
68 $\frac{1}{2}$	2	3,

EXPERIMENTS I myself made on the solvent power of water simply impregnated with Fixible Air, upon human calculi.

See Experiments and Observations on Fixible Air, London, printed, 1776.

Original weight of the calculi.	Time they continued immersed.	Weight lost by the calculi.
6 grains.	15 days.	$4\frac{1}{2}$ grains.
7	31	4
$4\frac{1}{8}$	31	$2\frac{1}{2}$
5	31	$2\frac{1}{2}$

EXPERIMENTS

On the antiseptic qualities of the Alkaline Solution saturated with Fixible Air.

Three pieces of lean mutton, a drachm each in weight, were, on Dec. 21, 1784, severally put into eight ounces of spring water, into the same quantity of water saturated with Fixible Air, and into the same quantity of the alkaline solution, and all closely corked up, and placed in a closet in a room wherein a constant fire was

was kept. The weather being very cold no change was perceived for several days.

On Dec. 29, the vial with the simple water began to look cloudy, but scarcely any smell was perceivable.

The others continued clear and sweet.

On Jan. 2d, 1785, the smell was more perceivable, but still faint, in the vial with simple water; some little of a musty smell was perceivable in the vial, with water saturated with Fixible Air; but the mephitic alk. solution still continued free of smell, and the fluid clear.

Jan. 3d. The vial with the simple water had acquired a smell evidently putrid. That with the water simply with Fixible Air had the musty smell much increased. That with the mephitic alkaline solution was perfectly sweet.

EXPERIMENTS

To determine the comparative quantity of Fixible Air contained in Salt of Tartar, and in a proportionable quantity of the Mephitic Alkaline Water.

EXPERIMENT I.

Two ounces, by measure, of the mephitic alkaline water, were put into a vial about three ounces contents, and exactly counterpoised in a nice balance. This with the corresponding weight being set aside, I mixed forty drops of oil of vitriol with one ounce, by measure, of water, and counterpoised that also, together with the vial that contained it. I then added the acid fluid to the alkaline, drop by drop, until all effervescence ceased, after which, I again weighed both the vials with their respective contents.

The acid liquor had lost one hundred and sixty-seven grains, and the alkaline had gained only one hundred and fifty-eight;
 so

so that nine grains of air were dissipated. Hence it appears, that fifteen grains of Salt of Tartar in solution, was capable of containing nine grains of Fixible Air, which, if we suppose Fixible Air to be in weight to common air as three are to two, amount to about thirteen ounce measures.

EXPERIMENT II.

Twenty grains of dry Salt of Tartar were put into a vial, and accurately counterpoised, as was another vial containing diluted vitriolic acid; I dropped the acid upon the alkali until all effervescence ceased. On weighing each of them again, the acid was found to have lost fifty-three grains, and the alkali to have gained forty-seven and a half—difference five grains and a half. The dry salt of tartar therefore appears not to be half saturated with Fixible Air, being in this respect to that contained in the mephitic alkaline water, as eleven to twenty-four.

According to Dr. Dobson's Experiments

on this * subject, the salt of tartar he used contained a smaller proportion of fixible air than that here employed, two drachms being computed by him to contain only twenty-eight grains of Fixible Air, whereas in the above experiments, that quantity is reckoned to contain thirty three grains.

* See his Medical Commentary.

REMARKS UPON,
AND
INFERENCES FROM,
THE FOREGOING
CASES AND EXPERIMENTS.

THE Cases above related, which are described from the accounts given by the parties themselves, persons of the most undoubted veracity, all of whom, two excepted, are now living, and whose present state of health bears the strongest confirmation of their testimony, will no doubt have their due weight with the reader.

In Cases III. and IX. a calculus of the kidney is thought, by the gentlemen who

relate their own cases, to be actually formed; and there is almost a certainty of the existence of one in Case II. But although in the others we have no assurances of any large stone being generated, yet many fabulous concretions of no inconsiderable size have been voided; and the pain, and other symptoms, appear to have been as severe as can well be imagined.

It must be a comfortable reflection to those thus afflicted, to find, from the above Cases, that relief may be expected before any considerable dissolution of the calculus could be supposed to take place, and even whilst we know that it is really subsisting. Ease was obtained in Cases II. III. VII. VIII. XII. XIV. XV. soon after the commencement of the use of the remedy; which we can only attribute to the change it produces in the urine itself.

It is observed of this discharge, that in calculous paroxysms, especially if accompanied with great pain, it is almost always caustic and irritating, like other fluids secreted

creted from inflamed parts. The mucus of the nose, which is in general mild and bland, becomes frequently, by a catarrhus inflammation of the vessels that secrete it, so acrid, as to excoriate those parts of the nose and lips upon which it falls. A similar change takes place in the urine, which, under such circumstances, generally feels scalding and painful to the ducts through which it passes; and this irritation constitutes no small part of the misery of the sufferers.

I would not, however, by any means deny that the mechanical action of calculous substances is often sufficient to cause great pain. Experience proves that this is frequently the case; but it is equally certain, that large calculi both of the kidneys and bladder have remained there many years with little trouble or uneasiness, and that even the pain produced by passing them is by no means proportioned to their size. A pretty large concretion, compared with the diameter of the urinary ducts, is mentioned, in one of the cases above recited, to be discharged without pain; whilst others

others of a less bulk were often accompanied, in their passage, with great torture, and large effusions of blood.

The particles of sand, that come away, are often too inconsiderable to cause the uneasiness that is experienced, were not the membranes that line the ducts in a state of inflammation, and constant irritability. This acrimonious condition of the urine is almost constantly accompanied with a disposition to precipitation. Hence the turbid appearance of this discharge in such paroxysms, which the sufferers often vainly flatter themselves to be the crisis of their disorder, when in reality it is no more than an indication of its prevalence. Both these circumstances the saturated alkaline solution is very efficacious in removing, neutralizing as it were the acrimony of the urine, and restoring to it, together with its natural colour, its power of retaining in perfect solution those substances which it was intended by nature to discharge.

Another circumstance, much in favour of a trial of this remedy, is, that it acts by

no violence of operation. The first effects, observed in all the instances above related, seem to have been the abatement of the pain and uneasiness, and the restoration of the urine to its natural colour and other properties. It is not found to act even as a stimulus on the urinary secretion, a thing somewhat remarkable; and though in one case it may appear to have exerted some aperient effect, this was so inconsiderable as to render it a matter of doubt if it was to be imputed to the qualities of the medicine, or to the taking in an additional quantity of watery fluid, which, it is well known, will often produce that effect. It no-where appears to have injured the appetite, digestion, or general health. It has manifested no septic qualities in itself, nor produced any upon the system; nay, those which took place from the use of the caustic alkaline lixivium, ceased during the trial of this remedy. The persons I have seen, who have tried it, have exemplified its innocence respecting the general health, as strongly as its particular efficacy in this complaint.

It appears that the use of this medicine is not necessary to be superseded by slight indispositions. It has been taken in place of the common saline draught, and no very observable difference found in the effect; and one of the cases shews, that it may be continued, without any apparent injury, during the course of a common gouty paroxysm.

I would not, however, by any means assert, that the indiscriminate use of this remedy is admissible in all states of health. The quantity may often be an objection to some; the taste may prove disagreeable, and perhaps in some complaints (though I know of none at present) it may be specifically injurious. Experience, joined with prudence, is the only guide we have to direct us in such circumstances.

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But although I think it probable that the principal advantage derived from this remedy is owing to the change it produces in the urine; yet the experiments shew, that it possesses considerable powers as a solvent of the calculus. That its efficacy
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in this point of view may be compared with that of water simply impregnated with Fixible Air, I have formed the foregoing comparative table of their effects respectively. The difference in their solvent powers is inconsiderable; whilst the operation of the alkaline saturated solution is much milder, and, as I think, of a different kind from that of the simple impregnation of water with Fixed Air.

From examination of the effects of the two menstrua, it should seem that the action of the latter was principally upon the animal gluten or mucus that connected the sandy particles, which it gradually disunited, until they fell into powder; whereas from the corroded and worm-eaten appearance of the calculi immersed in the alkaline solution, the sandy particles themselves seem to have been acted upon. How this is brought about, is matter of difficult investigation.

From Bergman's experiments, it appears, that the acid of sugar and calcareous earth, which probably form the stony part of the calculus,

calculus, bear a stronger attraction to one another than any body does separately to either ; so that the addition of no simple substance, at least any that we can introduce into the body, will separate them. But we should consider, that many bodies are capable of decomposition by a double elective attraction, that are not so by any other means. Thus vitriolate tartar may be decomposed by solution of silver, though neither of the separate ingredients would have any effect. This may possibly take place here, the alkaline salt attracting the acid of the sugar, and the Fixible Air the calcareous earth ; and as the former of these compounds is soluble in a watery fluid, and the latter so when the Fixible Air is redundant, this may account for the clearness of the urine, and its freedom from precipitation, which the taking this remedy induces. The compound of the acid of sugar with calcareous earth is scarcely soluble in water.

I make no doubt that the change in the *qualities* of the urine may be in part owing to the same cause. It is true, the saline

AQUA MEPHITICA ALKALINA. III

line substance formed by the union of the acid of sugar with calcareous earth, does not appear very acrimonious to the senses; but we should consider, that our senses are very imperfect judges of specific stimuli. Tart. emetic. and mercurius dulcis, whose operation on the stomach and bowels is so violent, betray no such effects in their sensible qualities; and we frequently find that clear, pale, and insipid urine, is retained with greater difficulty than what appears much more saline and acrimonious. It is possible that this compound may possess some specific stimulus on the bladder and urinary organs.

The alkaline solution has exerted various degrees of a solvent power upon the different calculi, some resisting its operation more than others; but none have totally withstood its influence. This difference may be owing to several causes, such as the calculus having remained exposed a longer time to the air, which increases its hardness, as it does that of several kinds of stone; its having been slower or quicker produced; or its containing a different proportion

portion of animal mucus; and probably other circumstances, which we do not at present, and perhaps never may understand.

It appears pretty plain, I think, that diuretic remedies, merely as such, have no good effects in calculous complaints. Independent of their stimulus, which I believe always to be injurious, it is found, that a quick secretion of urine has no effect in preventing the generation of calculi. A gentleman, whose case is related above, had a stone generated evidently during a course of the Harrowgate waters, which acted powerfully as a diuretic.

The experiments made with the saturated alkaline solution, as an antiseptic, confirm the observations of Mr. Colborne, on the effects it shewed on his urine; and we may infer from both, that no danger is to be apprehended from any putrefactive tendency, which, as an alkali, it might be supposed to produce.

In the former editions of this work it
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is mentioned as a probable conjecture, that a solution of the *fossil* alkali saturated with fixible air, might prove equally efficacious with the *vegetable* in the relief of calculous complaints. Mr. Colborne's very judicious experiments, which shew that it possesses the same solvent powers upon the gravelly concretions out of the body, together with the great similitude it bears in its chemical properties to the vegetable alkali, first led me to adopt this opinion, which has been since confirmed, by considering, what did not before occur to me, that this remedy in form of a mineral water had long been in use, and even high reputation, for the cure of similar complaints.

The waters of Carlsbad in Bohemia, so called in honour of the emperor Charles IV. who in the year 1370 discovered their medicinal virtues, are celebrated by Hoffman for their good effects in calculous complaints. "In cases,"* he says, "where
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* Sive enim renes, ureteres et vesica muco tartareo et sabulo obfideantur, sive calculus et lapidosa materia in ureterum cavo subsistat et diros dolores suscitet,
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the kidneys, ureters, and bladder are clogged with tartarine mucus, and gravel, or where a calculus is actually formed, and by remaining fixed in the urinary passages, excites the most direful agonies, the virtues of the Carlsbad waters are particularly serviceable, by loosening the adherence of such matters to the urinary ducts, and washing them away, and also in abating the spasmodic strictures of the passages, and thus procuring a free discharge for the calculous concretions."

" They moreover," as *hè* says, " prevent the generation or increase of calculi, by their diluting qualities, and by their moderating the saline acrimony of the humours,

tam præclara Carolinarum est facultas, ut copiosius ad renales tubos delatæ, intus contentas sordes et materias alienas eliquando et fluxiles reddendo ejeciant, spasticis autem stricturis ureterum resistendo, eisdemque ampliando et laxando humoris ope obhærescentem in eorum alveo lapidem protrudant et elidant. Quin ipsam autem generationem calculi ejusque incrementum antevertunt; dum humores diluunt et falsedinem et acrimoniam eorum contemperant, quo minus mucosæ et salæ materiæ coire et concrementum lapidosum exoriri possit. Accedit et illud quod thermæ hæ aquæ si urina cum ardore et dolore stillet, exoptatissimam ipondeant opem. *Hoffman de Thermis Carolinis*, § XIV. Cap. V.

mours, by which the saline and mucous matter is prevented from acquiring a hard or stony consistence. These waters likewise produce the happiest effects in abating the heat and pain that accompany the passage of the urine."

The good effects above-mentioned to be produced by the Carlsbad waters, are almost exactly the same with those which proceed from the use of the mephitic alkaline water, which is by no means extraordinary, if we consider that the two remedies resemble one another so nearly. The water of Carlsbad contains, as its principal impregnation, the * fossil alkali largely combined with † Fixible Air, which explains its beneficial operation in this dis-

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order

* Affuso syrupo violarum thermæ hæ viridem colorem induunt. *De Thermis Carolinis*, § VI. Cap. II.

† Thermæ hæ cum quocunque acido, sive sit mite, ut acetum, sive forte, ut spiritus salis, vitrioli, aut nitri, effervescent cum magnâ bullularum et exhalationum in aerem copiâ. *De Thermis Carolinis*, § VI. Cap. II.

Licet odor circa scaturiginem obvius, volatile quoddam principium salinum prodatur; non tamen urinosis quippiam redolet, sed similis odor ferme est illi, quando coquitur sal tartari cum ejus cremore mistum in aquâ. *De Therm. Carolinis*, § XIII. Cap. II.

order more satisfactorily, than by referring it altogether to the aerial impregnation, as is done by Dr. Dobson. However, according to Hoffman's account, it contains but a dilute solution of the alkaline salt, not more than one drachm* being contained in two quarts of the water, whereas eight times that quantity is contained in the mephitic alkaline liquor. But we know that a considerable proportion of saline matter is always lost in such experiments, it not being possible to recover from a solution of this kind, as much of the salt as we are assured it contains, part of it being dissipated by being changed into volatile alkali, by being united with phlogiston, and part lost by crystallizing on the filtre, and by other inaccuracies unavoidable in such trials. It is therefore certain that the Carlsbad water contains a larger

* Ex libris duabus medici ponderis obtinuimus drachmam materiæ salino-terreæ, quæ aquæ ope iterum liquata, et per chartam emporeticam trajecta, concretionem factâ, salis puri dedit drachmam circiter dimidiam: hoc sal, teste sapore, proxime accedit ad ingenium salis tartari intensè alcalizati. Confligit enim cum quovis acido, et cum sale ammoniaco mixtum, penetrantissimum volatilem spiritum elicit. *De Thermis Carolinis*, § VII. Cap. II.

larger proportion of alkali than is stated by Hoffman, though at the same time the impregnation is not strong. To make amends however for its weakness, the Carlsbad water is drank in much larger quantity than what the mephitic alkaline water is taken. Hoffman speaks of from 15 to 18 cups, as the daily quantity for rather* weakly people to begin with, which, says he, is increased by most of those who use it to thirty, and by some few to forty cups a day.

How much the cup or *ollula*, as he calls it, might contain, according to our measure, I cannot determine, but I think we can scarcely suppose that a mineral water could be given out in cups of less than a quarter of a pint contents. The middle dose then, at this rate, must be three quarts and three half pints daily, which would contain, according to Hoffman's

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* Proinde tutius est primo die XV. tantum vel XVIII. ebibere ollulas, nisi majorem dosin firmitas, minusque mobilis corporis constitutio suadeat. Insequenti vero tempore, plurimis ad XXX. usque quotidie ollulas, paucioribus ad XL. ascendere conducit. *De Therm. Carolinis*, Cap. VII. § VI.

calculation, which is unquestionably below the mark, 112 grains of the alkaline salt, which is not very different from the quantity contained in a pint of the mephitic alkaline water above described, which holds 120 grains, which is to the quantity daily taken in the Carlsbad waters as 15 to 14.

The same celebrated writer ascribes nearly the same virtues to the Selters water, "which," according to his account, "has a wonderful efficacy * in complaints of the kidneys, bladder, or ureters, when these organs are either obstructed by tartarine mucus, or calculous matter, or in a corroded and ulcerated state. Whilst it abates the acrimony of the humours, it dissolves and washes out the mucus, and clears the kidneys,

* In renum, vesicæ et ureterum morbis, qui vel a tartareo muco et calculosâ materiâ has vias obstruente, vel ab erosâ et exulceratâ ipsarum substantiâ proveniunt, admirabilem habet virtutem. Dum enim humorum acrimoniam temperat, mucum dissolvit et eluit, renesq; vesicam et ureteres a materiâ ipsius inhærente repurgat, non modo ad calculum præcavendum, aut jam præsentis incrementa impedienda, præsentis est efficacis, verum etiam in stranguriâ difficilique ac dolorificâ urinæ crassæ ac turbidæ miçtione, exoptatissimas affert suppetias. *Hoffman de Elementis et Viribus Fontis Selterani*, § XIV. Cap. II.

neys, ureters, and bladder from any matter of this kind that may be lodged in them, and tends, not only to prevent the generation of a calculous, or to stop the increase of one already formed, but also affords the most desirable relief in the strangury, and when the urine is voided with pain and difficulty, and is thick and turbid in its appearance. The Selters water, as well as that of Carlsbad, is impregnated with the * fossil alkali, but in larger proportion, two quarts of the Selters water containing four scruples of alkaline salt, whereas the same quantity of the Carlsbad water contains no more than three. The alkali however here, as well as in the other, appears to be fully saturated † with Fixible

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Air.

* Selteranarum libras duas medicas super leniori igne, quem carbonēs subministrarunt ardentes, evaporationi commisimus, et en! materiæ albæ salinæ tenuissimæ, drachinam unam cum duodecim granis obtinuimus.—Idem residuum in aquâ liquatum et per chartam colatum bibulam, præbuit lixivium, ex quo, lenioris exhalationis ope, alcalini salis scrupulos duos obtinuimus. *Hoffman de Element. et Viribus Fontis Selterani*, § V. Cap. II.

† Sicuti ergo singula hæc experimenta planum atque testatum faciunt fontem Selteranum affluentem salis alcalini puri copiam in complexu suo alere, ita
pariter

Air. I do not know in what quantity the Selters water is taken; but if it be drank as largely as the Carlsbad water, about 150 grains, or two drachms and a half of the alkaline salt will be the daily dose, if we compute each *ollula* or glass at a quarter of a pint contents. Milk appears to be commonly joined with Selters * water in disorders of the kidneys, the milk of asses especially; and spices † and other aromatics are also occasionally combined with it, much in the same manner as is advised in the present work.

Dr. Nooth, a gentleman whose knowledge and sagacity in philosophy, as well as in medicine, are well known, suggested to me the probability that the alkaline salt, saturated with Fixible Air, and crystallized, might

pariter ex variis a me observatis phænomenis evictum esse credo, eundem instar omnium aquarum salubrium maximeque acidularum, purissimo illo volatili et minerali spiritu esse imbutum. Ibid. § VI. Cap. II.

Nec dubitare amplius licet, quin eidem spirituosio minerali ingredienti, salubris harum aquarum facultas quoad maximam partem tribuenda est. Ibid. § IX. Cap. II.

* Ibidem, § XI. XII. XIII. XIV.

† Ibidem, § XIX.

might perhaps be equally effectual as a lithontriptic, and in abating the acrimony of the urine as the mephitic alkaline solution, whilst it would be more convenient, as being easily portable, and also as it would be free of any stimulus, which the superabundant quantity of Fixible Air might produce on the urinary passages.

Not having made a trial of this preparation, I cannot answer for its effects in this way, but should think it not unlikely to succeed, especially when we reflect that a salt of a similar nature, crystallized from the Carlsbad waters, is recommended by Hoffman * in such complaints. If such
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* Et cum ob absorbentem suam facultatem, acidum, cujus cum terrâ connubium gignit calculum, cicurare et in medium sal convertere valeat; hinc tam ad aver-tendam tartarei coaguli genesis, quam exturbandum minorem calculum insignis est efficaciam. Quo nomine etiam iis commendari vix potest, qui, vel ob nativam, vel ab alio qualicunque errore diætetico, contractam renum et urinariæ vesicæ imbecillitatem, ejusmodi calculosis concretionibus et generandis et fovendis sunt idonei. Quemadmodum pariter singularem ejus experiuntur efficaciam, qui vehementes a calculo in arc-tum et nervosum ureterum cavum intruso, dolores sentiunt, quibus, præ omnibus aliis medicinis lithontripticis,

a preparation be attempted, it will be necessary to use the greatest caution in previously saturating the alkaline solution with Fixible Air to its fullest extent, and of carrying on the evaporation as gradually, and of course, with the least heat possible, and frequently removing it from the fire, and suffering the salt to crystallize, which last process also should be gradual, and therefore when the liquor is removed from the fire, it should cool very slowly, and when cold be carefully poured off from the crystals that are formed, and again evaporated in like manner. I apprehend that it would be proper, when the liquor is evaporated pretty nearly to the point at which crystallization would begin to take place, when the liquor should be cold, to put it again into the glass machine, and impregnate it a second time with Fixible Air, which will probably, by supplying the Fixible Air that may have been dissipated by the heat, accelerate the crystallization, and ensure the neutralization of the alkali.

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ticis, tam resolvendo, præsertim si recens fuerit tartarei mucii concrementum, quam exturbando illius copiam egregiè et citò, opitulatur sal Carolinarum. *De Sale Medicinali Carolinarum*, § XXII.

The mephitic alkaline solution, when meant to be evaporated, should be made much stronger than when it is meant to be drank, yet should not be so much loaded as to impede or clog the tubes through which the Fixible Air rises. About four ounces of salt of tartar to a pint of water, seems likely to prove a proper quantity. It should be noticed that the stronger the solution, the longer time it would require to be neutralized by the Fixible Air.

Perhaps the fossil alkali might be more convenient for this purpose, as it crystallizes more easily than the vegetable; but it must be observed also, that the fossil alkali will crystallize, before it be perfectly neutralized by the Fixible Air, and on that account more caution will be necessary in saturating it perfectly before any evaporation be commenced, and of conducting the evaporation itself as slowly as possible.

Experience will best ascertain the dose in which such a remedy may be taken. Perhaps one drachm daily might be sufficient to begin with, which might be gradually

dually increased to two, three, or more. Hoffman says, that the Carlsbad salt is taken to six drachms, or an ounce, without producing any other effect than that of proving gently laxative.

To what the wonderful propensity, in certain habits and constitutions of body, to generate urinary calculi, is owing, is yet undiscovered. Various modes of life, and regimens of diet, have been assigned as causes, and many facts have been adduced as proofs; but these accounts are all so ambiguous, inconsistent, and contradictory, that little can be concluded from them. Hard waters are at one time believed to produce them; at another, they rather tend to prevent their generation: wine is at one time preventive, and at another productive, of calculi; and malt liquor, which some condemn, is by others as extravagantly recommended. *

It appears highly probable, that the cause originally consists in the structure or nature of the secreting gland itself. By
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* See Medical Commentary, p. 128.

what means this can change the quality of the fluid, so as to render it at one time apt to precipitate its contents, and at another to hold them in perfect solution, is to us inconceivable; but not more so than the generation of blood from the chyle, or of bile from the blood, the mechanism or process of which is probably among the secrets of nature too deep for our comprehension. It is at least certain, that confinement to a certain posture will in some instances produce this complaint. I have seen it originate from sitting long at a sedentary employment, as writing; and from long confinement to bed, by an illness no ways connected with calculus. Ramazzini makes the same observation of persons whose way of life requires a standing posture; which he instances by that of the attendants at the courts of princes, those of Spain especially, among whom disorders of this kind were particularly frequent.

Whether these theories be true or false; whether the remedy acts by means of chemical combination with the fluid secreted, or by any still more obscure means upon
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the secreting organ itself; the facts still remain unimpeached. The cases above related evince, beyond a doubt, that the painful symptoms in calculous disorders have been removed, and ease procured, by the use of this remedy, and this without any ill effect on the general health; but, on the contrary, with great amendment of it in most cases. To account for these, is the province of philosophical investigation; and with that view I have, however imperfect they may be, offered my sentiments; but whether the opinion I have here adopted be well or ill founded, the facts are equally valuable, and will, I trust, encourage the farther trial of a remedy, which, in a manner the most easy, and favourable to the health in general, bids fair to relieve, in a degree hitherto unexperienced, one of the most excruciating disorders that is incident to human nature.

F I N I S.

